

# Outline of Important Points

## Fundamentals of air conditioning systems

- A comfortable interior temperature is determined by the prevailing outside temperature and adequate air flow.
- When the temperature increases from 25 to 35°C, a person's sensory perception and the powers of deduction diminish by approx. 20%.
- In addition to reducing the temperature, the air conditioning system also dehumidifies and cleans the air.
- Heat always travels from the higher to the lower temperature level and never the other way round.
- Refrigerant R134a is utilized in current vehicle air conditioning systems. R12 must no longer be used due to its high ozone depletion potential.
- PAG refrigerator oil is used.
- The refrigerant circuit is divided into a high-pressure section and a low-pressure section. The separating points are the expansion valve and the compressor.
- There are two main types of compressor: Internally controlled with electromagnetic clutch and externally controlled with electric control valve and without defeatable magnetic clutch.
- Condenser and condenser module - in connection with the condenser module, the dryer is mounted on the outside and the dryer element can be replaced.
- The liquid reservoir can absorb only a limited amount of moisture and cannot regenerate.
- The expansion valve has a fixed setting.
- The evaporator must not become dirty. This would otherwise produce odor producing bacteria.
- The evaporator blower must run permanently during operation of the air conditioning system.
- The refrigerant circuit essentially consists of the compressor, condenser, liquid reservoir, expansion valve, evaporator, hoses and pipes as well as regulation and control devices.
- There are two variants of air temperature control in the passenger compartment: Air-based and Water-based temperature control.

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## Glossary

### Boiling Point

The temperature at which a substance changes from liquid to a gaseous state without further increasing the liquid's temperature. The Boiling Point is pressure dependent; as pressure increases so does the boiling point.

### BTU

British Thermal Unit is the amount of heat that will raise or lower the temperature of one pound of water by one degree Fahrenheit.

### Condensation

The procedure in which a material changes from a gaseous state to a liquid.

### Cold

A condition of low temperature defined as the lack of heat.

### Cooling by pressure relief

A gas under pressure cools down when it is allowed to suddenly expand. The pressure relief leads to the evaporation of the material which causes heat to be absorbed by it.

### Critical Point

The exact instant as a material is changing from liquid to vapor state when condensation is no longer possible. A substance above its Critical Point is always in vapor state.

### Dew Point

The temperature at which vapor begins to condense.

### Evaporation

The procedure in which a material changes from a liquid state to a gas.

### Heat

The form of energy that causes substances to rise in temperature, fuse, evaporate, expand, or undergo any of various other related changes, that flows to a body by contact with or radiation from bodies at higher temperatures, and that can be produced in a body (as by compression) or the friction between molecules.

### HVAC

Heating, ventilation and air conditioning.

### Refrigerant

The chemical medium used in the heat exchange process. Refrigerant can be found in an air conditioning system in liquid or gaseous form depending on the pressure and temperature conditions.

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### Latent Heat

Hidden heat, that when added or removed, causes a change of state – but not a change in temperature, thus it can't be measured with a thermometer.

### Lin Bus

Local Interconnected network

### Saturation Temperature

Referred to as the boiling point or the condensing temperature. This is the temperature at which a refrigerant will change state from a liquid to a vapor and visa versa.

### Sensible Heat

Heat, that when added or removed, causes a change in temperature but not in state, it can be felt and measured with a thermometer.

### Specific Heat

The amount of heat that is required to cause a rise in temperature of a specific material.

### Sub Cooled Liquid

A liquid refrigerant which is cooled below its saturation temperature.

### Superheated Vapor

When refrigerant vapor which is heated above its saturation temperature.

If a refrigerant is superheated, there is no liquid present.